

1. A method for acoustic transducer calibration in a portable communications device comprising the steps of:

providing a source of pseudo random acoustical noise to an characterized external speaker source separate from the  
5 portable communications device;

directing the pseudo random acoustical noise to an input of a microphone used with the portable communications device;

adjusting first coefficients in at least one digital  
10 signal processor connected to the microphone for a desired microphone frequency response based upon the input of pseudo random acoustical noise;

discontinuing the source of pseudo random acoustical noise from the external speaker source;

15 applying the source of pseudo random acoustical noise to an internal speaker source in the portable communications device;

increasing the amplitude of the pseudo random acoustic noise such that it can be detected by the microphone;

20 adjusting second coefficients in the at least one digital signal processor for a desired internal speaker frequency response based upon the input of the pseudo random acoustical noise; and

25 returning the portable communications device to an operational mode.

2. A method of acoustic transducer calibration as in claim 1 further including the step of:

utilizing a filter between the source of pseudo random  
30 acoustical noise and the external speaker to compensate for irregularities in the frequency response of the external speaker.

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3. A method of acoustic transducer calibration as in claim 1 further including the step of:

5 comparing the output of the at least one digital signal processor with an optimal acoustic signal from the output of the pseudo random acoustic noise to provide an error signal for adjusting the coefficients of the at least one digital signal processor.

10 4. A method of acoustic transducer calibration as in claim 1 wherein the source of pseudo random noise is from the at least one digital signal processor.

5. A method of acoustic transducer calibration for tuning a microphone and speaker in a two-way radio without the use of test equipment comprising the steps of:

- 5        supplying a source of pseudo random noise from at least one digital signal processor;
- filtering the pseudo random noise to provide a compensated pseudo random noise signal;
- 10      supplying the compensated pseudo random noise signal to a speaker external to the two-way radio;
- directing the compensated pseudo random noise signal to a microphone associated with the two-way radio;
- filtering the output of the microphone to provide a compensated microphone signal;
- 15      supplying the compensated microphone signal to at least one digital signal processor;
- comparing the output of the source of pseudo random noise with an output of the digital signal processor;
- compensating a plurality of filter coefficients in the 20 at least one digital signal processor based upon differences in the source of the pseudo random noise and an output of the at least one digital signal processor; and
- stopping the source of pseudo random noise; and
- returning the electronic device to an operational mode.

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6. A method of acoustic transducer calibration as in claim 5, further including the step of:

- delaying the source of pseudo random noise compared with the output of the at least one digital signal processor for 30 synchronizing the source of pseudo random noise with the output of the at least one digital signal processor.

7. A method of acoustic transducer calibration for optimizing the frequency response and gain of a microphone located within a portable communication device comprising  
5 the steps of:

generating a source of acoustic pseudo random noise from at least one digital signal processor located in the portable communications device;

10 providing the pseudo random noise to an external speaker;

directing the pseudo random noise from the external speaker to the microphone;

porting the output of the microphone to at least one digital signal processor;

15 comparing the pseudo random noise with an output of the at least one digital signal processor; and

adjusting a plurality of coefficients in the at least one digital signal processor to produce an optimized microphone output for the portable communications device.

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8. A method of acoustic transducer calibration for optimizing the frequency response and gain of an internal speaker located within a portable communication device comprising the steps of:
- 5 generating a source of acoustic pseudo random noise from at least one digital signal processor located in the portable communications device;
- 10 providing the pseudo random noise to the internal speaker;
- directing the pseudo random noise from the external speaker to a microphone in the portable communications device;
- 15 porting the output of the internal speaker to the at least one digital signal processor;
- comparing the pseudo random noise with an output of the at least one digital signal processor; and
- 20 adjusting a plurality of coefficients in the at least one digital signal processor to produce an optimized internal speaker output for the portable communications device.

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